GW - 101

REPORTS

YEAR(S):

1993

ENVIROTECH INC.

GW-101

SEPTEMBER 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
FARMINGTON, NM 87401

Prepared For
The New Mexico Oil Conservation Division

Commissioned by
Mr. Maurice Sticker
Environmental Affairs Coordinator
Smith International Inc.

September 1993

Project: 91410

5796 U.S. HIGHWAY 64 - 3014 • FARMINGTON, NEW MEXICO 87401 • PHONE: (505) 632-0615

SEPTEMBER 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W
FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

PREPARED FOR
THE NEW MEXICO OIL CONSERVATION DIVISION

COMMISSIONED BY
MR. MAURICE STICKER
ENVIRONMENTAL AFFAIRS COORDINATOR
SMITH INTERNATIONAL INC.

PROJECT NO: 91410

SEPTEMBER 1993

ENVIROTECH INC.
ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO

(505) 632-0615

SEPTEMBER 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W
FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

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OCTOBER 04, 1993 **PROJECT NO: 91410**

SEPTEMBER 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

INTRODUCTION

Envirotech Inc. has been retained by Smith International, Inc., to monitor groundwater quality at three spill remediation sites located on the subject property at 2198 East Bloomfield Highway. This property was the staging yard for Smith Energy Services. The site is currently unoccupied. This sampling report is prepared for the New Mexico Oil Conservation Division (NMOCD), continuing a monitoring program of select monitoring wells. This sampling plan follows a request by Mr. William C. Olson of the NMOCD in a letter dated November 17, 1992 to Mr. Maurice Sticker of Smith International Inc (attached). The long term monitoring requested is designed to verify cleanup of the sites described in the following previously prepared closure reports:

- Surface Impoundment Closure Report, Wash Bay Solids Disposal Area (April 1992)
- Acid UST and Sump Closure Report, Acid Storage Tank and Loading Area (May 1992)
- Acid UST & Sump Closure Supplemental Report, Smith International, Inc., 2198 East Bloomfield Highway, Farmington, New Mexico (July 1992)
- Groundwater Assessment Supplemental Closure Report (October 1992)

All of the closure reports have been submitted by Smith International Inc. to the NMOCD.

From December 1991 to June 1992, Envirotech Inc. conducted an extensive abatement program for site closures. Three sites of principal concern were involved at the subject property. These sites consisted of the:

Fuel Underground Storage Tank System (USTS)
Wash Bay Solids Disposal Area
Acid Tank Storage and Loading Area

Lead State of New Mexico regulatory agencies were contacted and involved with the closure operations. At all three sites, the reclamation action consisted of excavation and removal of the hydrocarbon contaminated soils for treatment. The excavations were extended to depths on the order of 28 feet (approximate depth of groundwater) with a trackhoe excavator. Approximately 13,000 cubic yards of soil were removed for treatment.

Based on the site assessment conducted during the closures and abatement operations, the hydrocarbon contamination of soil appeared to be limited to the immediate area around each site. All soils exceeding the current regulatory levels for hydrocarbon contamination were excavated and removed for remediation in all areas practically feasible. Prior to backfilling, approval to close was given by Mr. Denny Foust, Oil and Gas Inspector, NMOCD, and/or the NMED for all areas of concern.

As part of the pre-abatement assessment, three groundwater monitor wells were installed on the property. Water samples analyzed from these wells indicated that the groundwater quality had not been significantly impacted. Considering the extent of the soil contamination, the NMOCD and NMED requested the installation of three additional groundwater monitoring wells and sampling to verify the groundwater quality. The analyses from the additional wells also indicated the residual hydrocarbon contamination to be well below the current regulatory limits. Well locations are designated on the site plan located in the Appendix.

PURPOSE & SCOPE OF SERVICES

The purpose of this monitoring plan is to complete the closure of those areas under the NMOCD's jurisdiction, the waste acid underground storage tank and the wash bay solids disposal area sites at the Smith International property. This sampling program is designed to complete a long term monitoring evaluation of the reclamation operations.

The scope of services that Envirotech provides includes the following:

A. Monitor wells MW-4 and MW-5 will be sampled in March and September of 1993. Thereafter, these monitor wells will be annually sampled during the month of September. Future sampling requirements will be reviewed by the NMOCD.

B. Groundwater samples from the monitor wells are to be analyzed for pH, Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX). Samples are to be analyzed by Envirotech Labs using EPA method 8020 for BTEX.

C. The results of the monitor well sampling will be submitted to the OCD within 60 days of the sampling event.

SAMPLING & ANALYSIS RESULTS

Monitor wells #4 and #5 were purged by bailing until a minimum of three (3) well volumes had been removed. After purging, water samples were collected in laboratory supplied 40 ml VOA vials and preserved with 5% $HgCl_2$. The water samples were placed on ice and transported to Envirotech's laboratory for BTEX analysis using United States Environmental Protection Agency (USEPA) Method 8020. Sampling was done according to USEPA SW-846 protocol.

Field samples were collected simultaneously with laboratory samples for field testing of temperature, conductivity, and pH.

A summary of the results of the laboratory analyses for the samples collected September 21, 1993 are presented in Table 1. Laboratory results for previous samples collected are also included for comparison purposes. Table 2 contains field test results.

Table 1
Groundwater Monitoring
Laboratory Results (µg/l)
Smith International Inc.
2198 East Bloomfield Highway
Farmington, New Mexico

WELL #/DATE	BENZENE	TOLUENE	ETHYLBENZENE	T-XYLENE
MW-4 (9-21-93)	N/D	N/D	N/D	0.5
MW-4 (3-30-93)	N/D	N/D	N/D	N/D
MW-4 (8-13-92)	N/D	5.4	4.1	N/D
MW-5 (9-21-93)	N/D	N/D	N/D	N/D
MW-5 (3-30-93)	N/D	N/D	N/D	N/D
MW-5 (8-13-92)	N/D	5.1	3.7	3.2

Notes:
1) N/D = Not detected @ method detection limits.
2) T-XYLENE = Total xylene including p,m, and o-xylene.
3) µg/L. = Micrograms per liter equivalent to parts per billion.
4) Test results by EPA Method 8020.

Table 2
Groundwater Monitoring
Field Test Results (3-30-93)
Smith International Inc.
2198 East Bloomfield Highway
Farmington, New Mexico

WELL #/DATE	OVM	pH	μMHO/CM	TEMP (°C.)
MW-4 (9-21-93)	N/D	7.1	1100	19
MW-4 (3-30-93)	N/D	6.9	190	16
NM-5 (9-21-93)	N/D	7.3	600	19
MW-5 (3-30-93)	N/D	7.3	250	16

Notes:
1) OVM = Organic Vapor Meter reading from well headspace prior to sampling.
2) μMHO = Conductivity measurement
3) N/D = Not detected

All laboratory sample results including QA/QC documentation are included in the Appendix.

CLOSURE AND LIMITATIONS

The scope of Envirotech's services was limited to sampling of the designated monitor wells for BTEX analysis and field testing. All work has been performed in accordance with generally accepted professional practices in geotechnical/environmental engineering and hydrogeology.

This report has been prepared for the exclusive use of the New Mexico Oil Conservation Division and Mr. Maurice Sticker of Smith International as it pertains to the subject site located at Farmington, New Mexico.

I hereby certify that the work described in this report was performed under my direct supervision, and that I am personally familiar with the nature of the work, the results of the monitoring, and the contents of this report.

Respectfully submitted,
ENVIROTECH INC.

Robert E. O'Neill

Robert E. O'Neill
Environmental Engineer

Reviewed by:

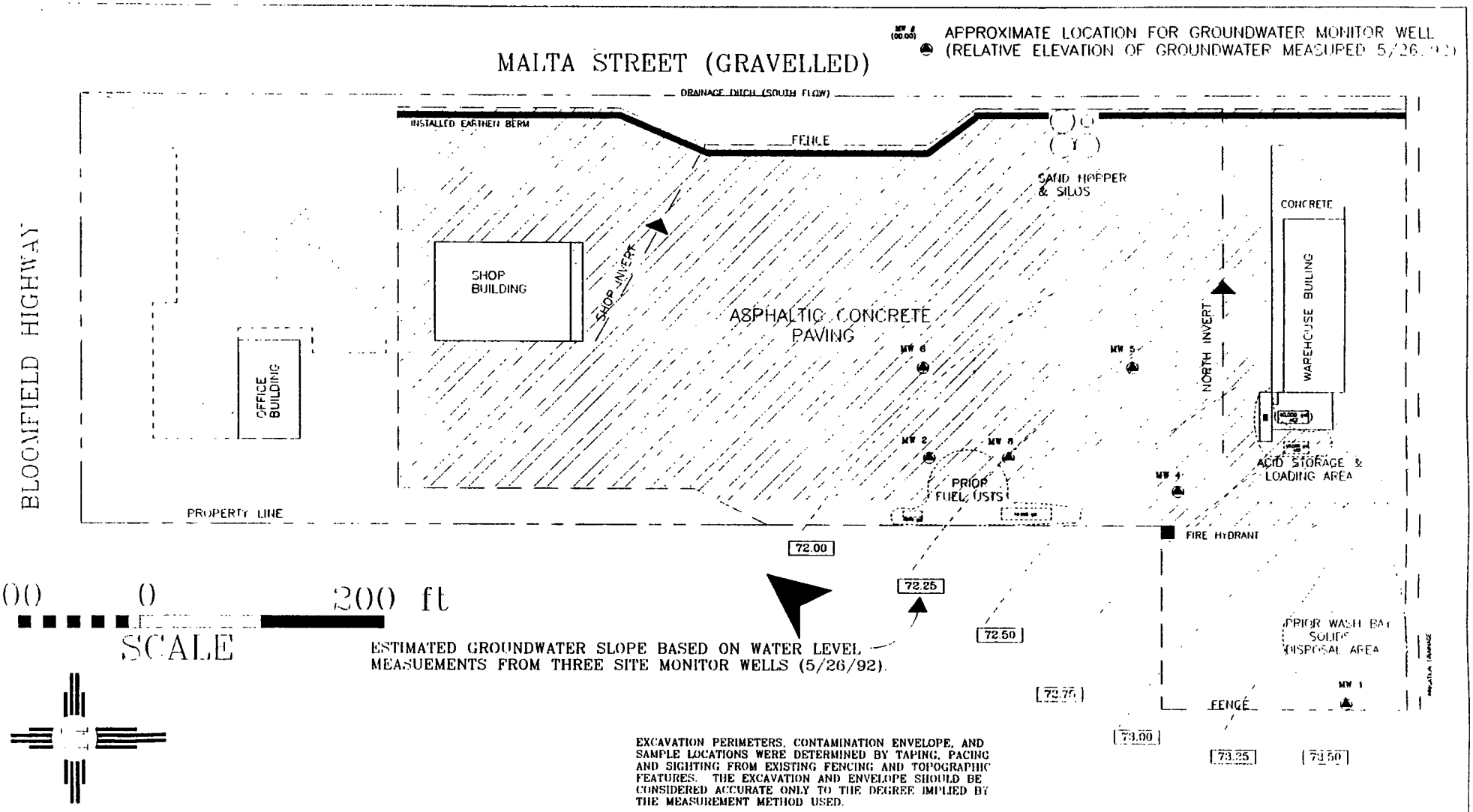
Jeffrey C. Blagg/FOR

Michael K. Lane, P.E.
Geological Engineer

Appendix: Site Plan
Laboratory Results
QA/QC Documentation
Chain-of-Custody

REO/reo

91410SOC.RPT



SMITH INTERNATIONAL INC.
1108 EAST BLOOMFIELD HWY
FARMINGTON, NEW MEXICO

PHASE 5 SAMPLING PROJECT NO: 91410

ENVIROTECH INC.

ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615

SITE PLAN & GROUNDWATER MONITOR WELL LOCATIONS

SHEET 1 DRAWN MNL

REVISED: REQ REV. DATE: 4/93

91410

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

DRUG FREE

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

November 17, 1992

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT NO. P-667-242-310

Mr. Maurice Sticker
Environmental Affairs Coordinator
Smith International, Inc.
16740 Hardy St.
Houston, Texas 72205-0068

RE: SITE REMEDIATION AND GROUND WATER ASSESSMENT
SMITH INTERNATIONAL, INC.
FARMINGTON, NEW MEXICO

Dear Mr. Sticker:

The New Mexico Oil Conservation Division (OCD) has completed a comprehensive review of the following documents submitted by Envirotech, Inc. on behalf of Smith International, Inc. regarding soil remediation activities and ground water quality investigations at the Smith International, Inc. Farmington, New Mexico service company facility:

1. April 1992 "SURFACE IMPOUNDMENT CLOSURE REPORT, WASH BAY SOLIDS DISPOSAL AREA".

2. May 1992 "ACID UST AND SUMP CLOSURE REPORT".

3. June 1992 "OFFSITE DRAINAGE CLOSURE REPORT".

4. July 1992 "ACID UST & SUMP CLOSURE SUPPLEMENTAL REPORT, SMITH INTERNATIONAL, INC., 2198 EAST BLOOMFIELD HIGHWAY, FARMINGTON, NEW MEXICO".

5. October 1992 "GROUNDWATER ASSESSMENT SUPPLEMENTAL, CLOSURE REPORT, SMITH INTERNATIONAL, INC., FARMINGTON, NEW MEXICO".

The remedial activities for contaminated soils related to Smith International's waste disposal activities, as contained in the above reports, meet the OCD's requirements in effect at the time of closure of these disposal units. However, since the October 1992 report documented the presence of low level ground water contaminants in the monitor wells downgradient of both the waste acid underground storage tank and the wash bay solids disposal area the OCD requires the following long term monitoring:

1. Monitor wells MW-4 and MW-5 will be sampled in March and September of 1993. Thereafter these monitor wells will be annually sampled during the month of September. Upon renewal of the facility's ground water discharge plan the sampling requirements will be reviewed.

2. Ground water samples from the monitor wells will be analyzed for pH, Benzene, Toluene, Ethylbenzene and Xylenes using EPA approved laboratory methods.

3. The results of the monitor well sampling will be submitted to OCD within 60 days of the sampling event.

Please be advised that OCD approval does not relieve you of liability should future sampling show ground water to be contaminated in excess of New Mexico Water Quality Control Commission ground water standards as a result of these closed disposal areas.

If you have any questions, please contact me at (505) 827-5885.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: Denny Foust, OCD Aztec Office
Michael K. Lane, Envirotech, Inc.

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Smith International	Project #:	91410
Sample ID:	MW # 4	Date Reported:	09-22-93
Laboratory Number:	6145	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	HgCl and Cool	Date Analyzed:	09-22-93
Condition:	Cool and Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.2
Toluene	ND	0.3
Ethylbenzene	ND	0.2
p,m-Xylene	0.5	0.4
o-Xylene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	96 %
Bromofluorobenzene	98 %

Method: Method 5030A, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

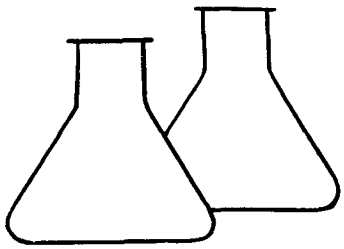
Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 E. Bloomfield Highway

Analyst

Review



ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Smith International	Project #:	91410
Sample ID:	MW # 5	Date Reported:	09-22-93
Laboratory Number:	6146	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	HgCl and Cool	Date Analyzed:	09-22-93
Condition:	Cool and Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.2
Toluene	ND	0.3
Ethylbenzene	ND	0.2
p,m-Xylene	ND	0.4
o-Xylene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	97 %
Bromofluorobenzene	99 %

Method: Method 5030A, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 E. Bloomfield Highway

Analyst

Review

ENVIROTECH LABORATORIES

5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615

QUALITY ASSURANCE/QUALITY CONTROL

DOCUMENTATION

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	09-22-93
Laboratory Number:	0922AM.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	09-22-93
Condition:	NA	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.2
Toluene	ND	0.3
Ethylbenzene	ND	0.2
p,m-Xylene	ND	0.4
o-Xylene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	98 %
Bromofluorobenzene	102 %

Method: Method 5030A, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

ENVIROTECH LABS

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PHONE: (505) 632-0615 • FAX: (505) 632-1865

** QUALITY ASSURANCE EPA METHOD 8020
MATRIX SPIKE - AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Sample Spike	Date Reported:	09-22-93
Laboratory Number:	6147-S-BTEX	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Analysis Requested:	BTEX	Date Analyzed:	09-22-93
Condition:	NA		

Parameter	Sample Result (ug/L)	Spike Added (ug/L)	Spiked Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	SW-846 % Rec. Accept. Range
Benzene	ND	20.0	18	0.2	88	39-150
Toluene	ND	20.0	18	0.3	90	46-148
Ethylbenzene	ND	20.0	19	0.2	95	32-160
p,m-Xylene	ND	20.0	20	0.4	100	46-148
o-Xylene	ND	20.0	21	0.3	102	46-148

Method: Method 5030A, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

3035

CHAIN OF CUSTODY RECORD

Client/Project Name: 91410 SMITH INTERNATIONAL

Project Location: 2198 E. BLOOMFIELD HWY.

Sampler: (Signature) R. E. O'Neall

Chain of Custody Tape No.:

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	BTEX	EDB/EDC	MTBE	NAPTHALENE			Remarks
MW #4	9-21-93	1110	6145	WATER	2	✓						
MW #5	9-21-93	1155	6146	WATER	2	✓						
MW #2	9-21-93	1350	6147	WATER	3	✓	✓	✓	✓			
MW #6	9-21-93	1255	6148	WATER	3	✓	✓	✓	✓			

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
R. E. O'Neall	9-21-93	1432	[signature]	9-21-93	1445
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		

ENVIROTECH INC.
5796 U.S. Highway 64-3014
Farmington, New Mexico 87401
(505) 632-0615

san juan repro Form 578 81

GW-101

ENVIROTECH INC.

PHASE 5
SEPTEMBER 1993 SAMPLING
SMITH INTERNATIONAL INC.
FARMINGTON, NEW MEXICO

Prepared for
The New Mexico Environmental Department

Commissioned by
Mr. Maurice Sticker

September 1993

Project : 91410

5796 U.S. HIGHWAY 64 - 3014 • FARMINGTON, NEW MEXICO 87401 • PHONE: (505) 632-0615

PHASE 5
SEPTEMBER 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W
FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

PREPARED FOR
THE NEW MEXICO ENVIRONMENTAL DEPARTMENT

COMMISSIONED BY
MR. MAURICE STICKER
ENVIRONMENTAL AFFAIRS COORDINATOR
SMITH INTERNATIONAL INC.

PROJECT NO: 91410

SEPTEMBER 1993

ENVIROTECH INC.
ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO

(505) 632-0615

PHASE 5
SEPTEMBER 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W
FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

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SECTION 2

APPENDIX

OCTOBER 04, 1993 **PROJECT NO: 91410**

PHASE 5
SEPTEMBER 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

INTRODUCTION

Envirotech Inc. has been retained by Smith International, Inc., to monitor groundwater quality at three spill remediation sites located on the subject property at 2198 East Bloomfield Highway. This property was the staging yard for Smith Energy Services. The site is currently unoccupied. This sampling report is prepared for the New Mexico Environment Department (NMED), continuing a two year monitoring program of select monitoring wells. The monitoring program, described in a March 9, 1993 Phase 5 Workplan, was verbally approved by the NMED on March 26, 1993. A Workplan addendum dated March 31, 1993 incorporating additional NMED requested laboratory analyses was formally approved by the NMED in a June 30, 1993 letter. This sampling parallels a New Mexico Oil Conservation Division (NMOCD) sampling plan requested in a letter to Smith International dated November 17, 1992. The long term monitoring is designed to verify cleanup of the site described in the following previously prepared closure reports:

- UST Closure Report, Diesel & Gasoline Fuel System (March 1992)
- Groundwater Assessment Supplemental Closure Report (October 1992)

All of the closure reports have been submitted by Smith International Inc. to the NMED.

From December 1991 to June 1992, Envirotech Inc. conducted an extensive abatement program for site closures. Three sites of principal concern were involved at the subject property. These sites consisted of the:

Fuel Underground Storage Tank System (USTS)
Wash Bay Solids Disposal Area
Acid Tank Storage and Loading Area

Lead State of New Mexico regulatory agencies were contacted and involved with the closure operations. At all three sites, the reclamation action consisted of excavation and removal of the hydrocarbon contaminated soils for treatment. The excavations were extended to depths on the order of 28 feet (approximate depth of groundwater) with a trackhoe excavator. Approximately 13,000 cubic yards of soil were removed for treatment.

Based on the site assessment conducted during the closures and abatement operations, the hydrocarbon contamination of soil appeared to be limited to the immediate area around each site. All soils exceeding the current regulatory levels for hydrocarbon contamination were excavated and removed for remediation in all areas practically feasible. Prior to backfilling, approval to close was given by Mr. Denny Foust, Oil and Gas Inspector, NMOCD, and/or the NMED for all areas of concern.

As part of the pre-abatement assessment, three groundwater monitor wells were installed on the property. Water samples analyzed from these wells indicated that the groundwater quality had not been significantly impacted. Considering the extent of the soil contamination, the NMOCD and NMED requested the installation of three additional groundwater monitoring wells and sampling to verify the groundwater quality. The analyses from the additional wells also indicated the residual hydrocarbon contamination to be well below the current regulatory limits. Monitor well locations are designated on the site plan located in the Appendix.

PURPOSE & SCOPE OF SERVICES

The purpose of this monitoring plan is to complete the closure of the UST site at the Smith International property. This sampling program is designed to complete a 2-year evaluation of the reclamation operations as described in the Phase 5 Workplan.

The scope of services that Envirotech provides includes the following:

A. Collect water samples from two down-gradient monitoring wells, MW-2 and MW-6, as shown on the attached site diagram. Sampling is scheduled to be done in March and September of 1993 and again in September of 1994. Sampling requirements beyond the initial sampling event will be reviewed by the NMED.

B. Samples are to be analyzed by Envirotech Labs for Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), MTBE, EDB, EDC, and Naphthalene.

C. Report on sampling results.

SAMPLING & ANALYSIS RESULTS

Monitor wells #2 and #6 were purged by bailing until a minimum of three (3) well volumes had been removed. After purging, water samples were collected in laboratory supplied 40 ml VOA vials and preserved with 5% $HgCl_2$. An additional one liter (1 L) sample was collected in a laboratory supplied glass container for the Naphthalene test. Field samples were collected simultaneously with laboratory samples for field testing of temperature, conductivity,

and pH. The laboratory water samples were placed on ice and transported to Envirotech's laboratory for BTEX and MTBE analysis using United States Environmental Protection Agency (USEPA) Method 8020. EDB and EDC analyses were done using USEPA Method 8010, and Naphthalene analyses were done using USEPA Method 8100. Sampling was performed according to USEPA SW-846 protocol.

A summary of the results of the laboratory analyses for the samples collected September 21, 1993 are presented in Table 1. Laboratory results for previous samples collected are also included for comparison purposes. Table 2 contains field test results.

Table 1
Groundwater Monitoring
Laboratory Results (µg/l)
Smith International Inc.
2198 East Bloomfield Highway
Farmington, New Mexico

WELL #/DATE	BENZENE	TOLUENE	ETHYLBENZENE	T-XYLENE
MW-2 (9-21-93)	N/D	N/D	N/D	N/D
MW-2 (3-30-93)	N/D	N/D	N/D	N/D
MW-2 (5-26-92)	N/D	N/D	N/D	N/D
MW-6 (9-21-93)	N/D	N/D	N/D	N/D
MW-6 (3-30-93)	N/D	N/D	N/D	N/D
MW-6 (8-13-92)	N/D	7.9	N/D	2.7
WELL #/DATE	MTBE	EDB	EDC	NAPHTHA.
MW-2 (9-21-93)	N/D	N/D	N/D	N/D
MW-2 (3-30-93)	N/D	N/D	N/D	N/D
MW-6 (9-21-93)	N/D	N/D	N/D	N/D
MW-6 (3-30-93)	N/D	N/D	N/D	N/D

Notes:
1) N/D = not detected @ method detection limits.
2) T-XYLENE = Total xylene including p,m and o-xylene.
3) µg/l = Micrograms/liter, equivalent to parts per billion.
4) MTBE = Methyl-tertiary-butyl-ether
5) EDB = Ethylene dibromide
6) EDC = 1,2-dichloroethane
7) Naptha. = Naphthalene
8) Test Results by EPA Methods 8020 (BTEX), 8010 (EDB, EDC, MTBE), and 8100 (NAPHTHALENE).

Table 2
Groundwater Monitoring
Field Test Results
Smith International Inc.
2198 East Bloomfield Highway
Farmington, New Mexico

WELL #/DATE	OVM	pH	μMHO/CM	TEMP (°C.)
MW-2 (9-21-93)	N/D	7.2	600	19
MW-2 (3-30-93)	N/D	7.0	190	16
MW-6 (9-21-93)	N/D	7.2	600	19
MW-6 (3-30-93)	N/D	7.0	190	17

Notes:
1) OVM = Organic Vapor Meter reading (PPM) from well headspace prior to sampling.
2) μMHO = Conductivity measurement
3) N/D = Not detected

All laboratory sample results including QA/QC documentation are included in the Appendix.

CLOSURE AND LIMITATIONS

The scope of Envirotech's services was limited to sampling of the designated monitor wells for BTEX, MTBE, EDC, EDB, and Naphthalene analysis. All work has been performed in accordance with generally accepted professional practices in geotechnical/environmental engineering and hydrogeology.

This report has been prepared for the exclusive use of the New Mexico Environmental Department and Mr. Maurice Sticker of Smith International as it pertains to the subject site located at Farmington, New Mexico.

I hereby certify that the work described in this report was performed under my direct supervision, and that I am personally familiar with the nature of the work, the results of the monitoring, and the contents of this report.

Respectfully submitted,
ENVIROTECH INC.

Robert E. O'Neill

Robert E. O'Neill
Environmental Engineer

Reviewed by:

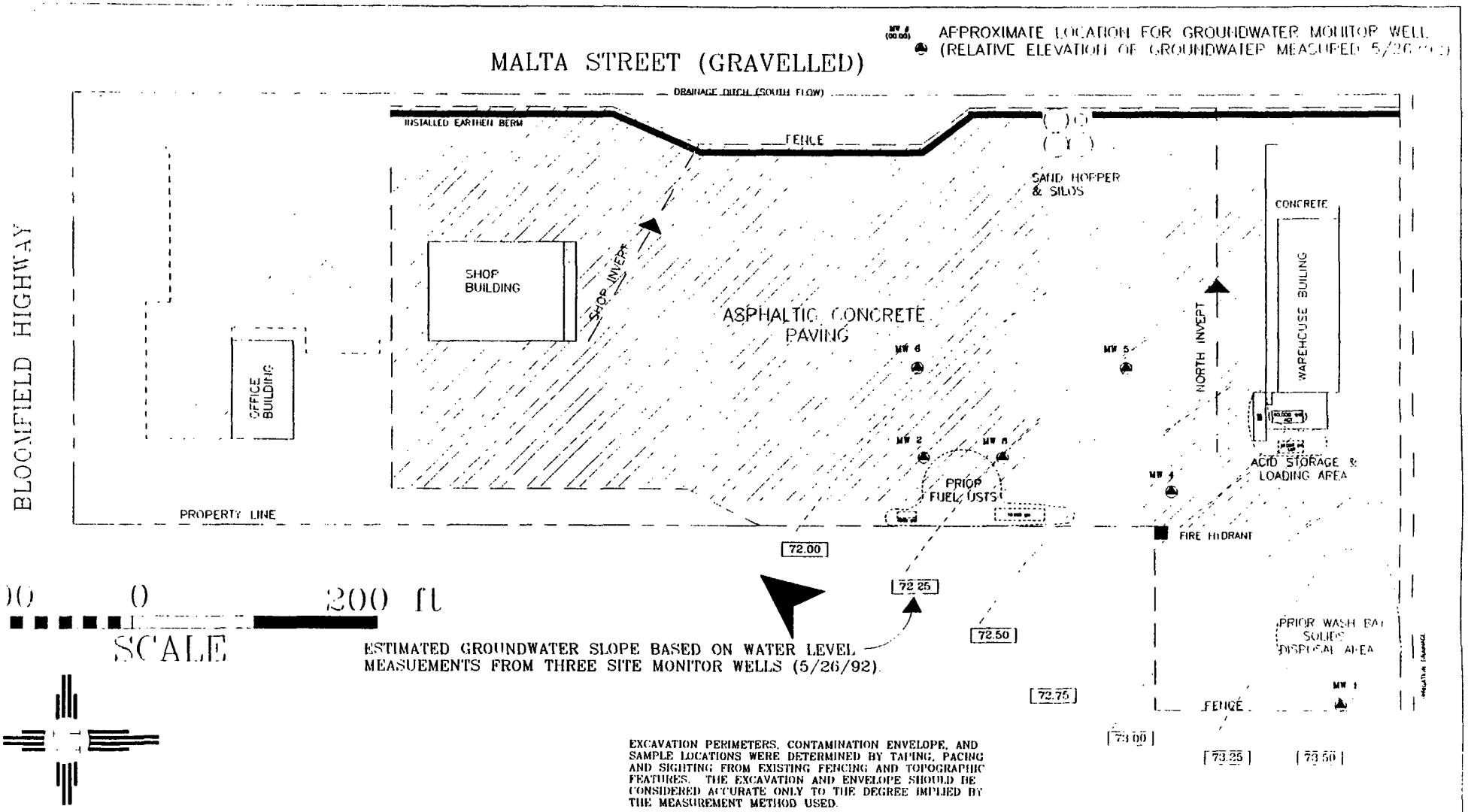
Jeffry C. Blagg/FOR

Michael K. Lane, P.E.
Geological Engineer

Appendix: Site Plan
Laboratory Results
QA/QC Documentation
Chain-of-Custody

REO/reo

91410SED.RPT



SMITH INTERNATIONAL INC.
1108 EAST BLOOMFIELD HWY
FARMINGTON, NEW MEXICO

PHASE 5 SAMPLING PROJECT NO: 91410

ENVIROTECH INC.
ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64--3014
FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615

SITE PLAN & GROUNDWATER MONITOR WELL LOCATIONS

SHEET 1 DRAWN MKL

REVISED: REO REV. DATE: 4/

ENVIROTECH LABS

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PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Smith International	Project #:	91410
Sample ID:	MW # 2	Date Reported:	09-22-93
Laboratory Number:	6147	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	HgCl & Cool	Date Analyzed:	09-22-93
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Methyl-t-Butyl Ether	ND	0.2
Benzene	ND	0.2
Toluene	ND	0.3
Ethylbenzene	ND	0.2
p,m-Xylene	ND	0.2
o-Xylene	ND	0.3
1,3,5-Trimethylbenzene	ND	0.3
1,2,4-Trimethylbenzene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	94 %
Bromfluorobenzene	102 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 E. Bloomfield Highway

Analyst

Review

ENVIROTECH LABS

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PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8010
HALOGENATED VOLATILE ORGANICS

Client:	Smith International	Project #:	91410
Sample ID:	MW # 2	Date Reported:	09-21-93
Laboratory Number:	6147	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	Cool	Date Analyzed:	09-21-93
Condition:	Cool and Intact	Analysis Requested:	DCE-DBE

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
1,1-Dichloroethane	ND	0.1
1,2-Dichloroethane	ND	0.1
1,2-Dibromoethane	ND	0.1

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Bromofluorobenzene	101 %
Bromochloromethane	103 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8010, Halogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

ND - Parameter not detected at the stated detection limit.

Comments: 2198 E. Bloomfield Highway

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PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	Smith International	Project #:	91410
Sample ID:	MW # 2	Date Reported:	09-23-93
Laboratory Number:	6147	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	Cool	Date Analyzed:	09-23-93
Condition:	Cool & Intact	Analysis Requested:	8100

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Naphthalene	ND	0.20
Acenaphthylene	ND	0.50
Acenaphthene	ND	1.02
Fluorene	ND	0.43
Phenanthrene	ND	0.87
Anthracene	ND	0.47
Fluoranthene	ND	0.20
Pyrene	ND	1.17
Benzo(a)anthracene	ND	1.05
Chrysene	ND	1.38
Benzo(b) & Benzo(k) fluoranthene	ND	0.45
Benzo(a)pyrene	ND	0.20
Indeno(1,2,3-cd) pyrene & Dibenzo(a,h)anthracene	ND	0.20
Benzo(g,h,i)perylene	ND	0.20

SURROGATE RECOVERY	Parameter	Percent Recovery
	1-fluoronapthalene	107 %

Methods: Method 8100, Polynuclear Aromatic Hydrocarbons, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 E. Bloomfield Highway

Analyst

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PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Smith International	Project #:	91410
Sample ID:	MW # 6	Date Reported:	09-22-93
Laboratory Number:	6148	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	HgCl & Cool	Date Analyzed:	09-22-93
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Methyl-t-Butyl Ether	ND	0.2
Benzene	ND	0.2
Toluene	ND	0.3
Ethylbenzene	ND	0.2
p,m-Xylene	ND	0.2
o-Xylene	ND	0.3
1,3,5-Trimethylbenzene	ND	0.3
1,2,4-Trimethylbenzene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	99 %
Bromfluorobenzene	100 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 E. Bloomfield Highway

Analyst

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ENVIROTECH LABS

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PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8010
HALOGENATED VOLATILE ORGANICS

Client:	Smith International	Project #:	91410
Sample ID:	MW # 6	Date Reported:	09-21-93
Laboratory Number:	6148	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	Cool	Date Analyzed:	09-21-93
Condition:	Cool and Intact	Analysis Requested:	DCE-DBE

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
1,1-Dichloroethane	ND	0.1
1,2-Dichloroethane	ND	0.1
1,2-Dibromoethane	ND	0.1

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Bromofluorobenzene	101 %
Bromochloromethane	104 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8010, Halogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

ND - Parameter not detected at the stated detection limit.

Comments: 2198 E. Bloomfield Highway

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EPA METHOD 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	Smith International	Project #:	91410
Sample ID:	MW # 6	Date Reported:	09-23-93
Laboratory Number:	6148	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	Cool	Date Analyzed:	09-23-93
Condition:	Cool & Intact	Analysis Requested:	8100

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Naphthalene	ND	0.20
Acenaphthylene	ND	0.50
Acenaphthene	ND	1.02
Fluorene	ND	0.43
Phenanthrene	ND	0.87
Anthracene	ND	0.47
Fluoranthene	ND	0.20
Pyrene	ND	1.17
Benzo(a)anthracene	ND	1.05
Chrysene	ND	1.38
Benzo(b) & Benzo(k) fluoranthene	ND	0.45
Benzo(a)pyrene	ND	0.20
Indeno(1,2,3-cd) pyrene & Dibenzo(a,h)anthracene	ND	0.20
Benzo(g,h,i)perylene	ND	0.20

SURROGATE RECOVERY	Parameter	Percent Recovery
	1-fluoronapthalene	100 %

Methods: Method 8100, Polynuclear Aromatic Hydrocarbons, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986.

ND - Parameter not detected at the stated detection limit.

Comments: 2198 E. Bloomfield Highway

Analyst

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ENVIROTECH LABORATORIES

5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615

QUALITY ASSURANCE/QUALITY CONTROL

DOCUMENTATION

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	09-22-93
Laboratory Number:	0922AM.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	09-22-93
Condition:	NA	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.2
Toluene	ND	0.3
Ethylbenzene	ND	0.2
p,m-Xylene	ND	0.4
o-Xylene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	98 %
Bromofluorobenzene	102 %

Method: Method 5030A, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

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ENVIROTECH LABS

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EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	09-22-93
Laboratory Number:	0922AM.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	09-22-93
Condition:	NA	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Methyl-t-butyl Ether	ND	0.2
Benzene	ND	0.2
Toluene	ND	0.3
Ethylbenzene	ND	0.2
p,m-Xylene	ND	0.2
o-Xylene	ND	0.3
1,3,5-trimethylbenzene	ND	0.3
1,2,4-trimethylbenzene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	98 %
Bromfluorobenzene	102 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

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PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8010
HALOGENATED VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	09-21-93
Laboratory Number:	0921vol.blk	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	09-21-93
Condition:	NA	Analysis Requested:	8010

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
1,1-Dichloroethane	ND	0.1
1,2-Dichloroethane	ND	0.1
1,2-Dibromoethane	ND	0.1

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Bromofluorobenzene	99 %
Bromochloromethane	95 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

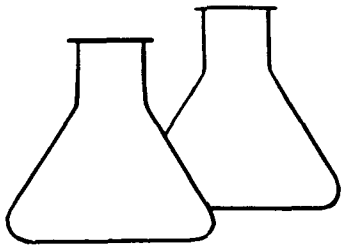
Method 8010, Halogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review



ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	09-23-93
Laboratory Number:	0923pah.blk	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	09-23-93
Condition:	NA	Analysis Requested:	8100

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Naphthalene	ND	0.2
Acenaphthylene	ND	0.5
Acenaphthene	ND	1.0
Fluorene	ND	0.4
Phenanthrene	ND	0.9
Anthracene	ND	0.5
Fluoranthene	ND	0.2
Pyrene	ND	1.2
Benzo(a)anthracene	ND	1.1
Chrysene	ND	1.4
Benzo(b) & Benzo(k) fluoranthene	ND	0.5
Benzo(a)pyrene	ND	0.2
Indeno(1,2,3-cd) pyrene & Dibenzo(a,h)anthracene	ND	0.2
Benzo(g,h,i)perylene	ND	0.2

SURROGATE RECOVERY:

Parameter	Percent Recovery
1-fluoronapthalene	102 %

Methods: Method 8100, Polynuclear Aromatic Hydrocarbons, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

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ENVIROTECH LABS

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PHONE: (505) 632-0615 • FAX: (505) 632-1865

** QUALITY ASSURANCE EPA METHOD 8020
MATRIX SPIKE - AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Sample Spike	Date Reported:	09-22-93
Laboratory Number:	6147-S-BTEX	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Analysis Requested:	BTEX	Date Analyzed:	09-22-93
Condition:	NA		

Parameter	Sample Result (ug/L)	Spike Added (ug/L)	Spiked Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	SW-846 % Rec. Accept. Range
Benzene	ND	20.0	18	0.2	88	39-150
Toluene	ND	20.0	18	0.3	90	46-148
Ethylbenzene	ND	20.0	19	0.2	95	32-160
p,m-Xylene	ND	20.0	20	0.4	100	46-148
o-Xylene	ND	20.0	21	0.3	102	46-148

Method: Method 5030A, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

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ENVIROTECH LABS

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PHONE: (505) 632-0615 • FAX: (505) 632-1865

** QUALITY ASSURANCE EPA METHOD 8020
MATRIX SPIKE - AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Sample Spike	Date Reported:	09-22-93
Laboratory Number:	6147-S-MTBE.	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Analysis Requested:	BTEX	Date Analyzed:	09-22-93
Condition:	NA		

Parameter	Sample Result (ug/Kg)	Spike Added (ug/Kg)	Spiked Sample Result (ug/Kg)	Det. Limit (ug/Kg)	Percent Recovery	SW-846 % Rec. Accept. Range
Methyl-t-Butyl Ether	ND	20	20.0	0.2	100	
Benzene	ND	20	17.7	0.2	88	39-150
Toluene	ND	20	18.3	0.3	91	46-148
Ethylbenzene	ND	20	18.9	0.2	94	32-160
p,m-Xylene	ND	20	20.3	0.2	101	46-148
o-Xylene	ND	20	20.6	0.3	102	46-148
1,3,5-TMBenzene	ND	20	19.8	0.3	98	
1,2,4-MTBenzene	ND	20	20.6	0.3	102	

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

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ENVIROTECH LABS

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** QUALITY ASSURANCE EPA METHOD 8010
MATRIX SPIKE - HALOGENATED VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Sample Spike	Date Reported:	09-21-93
Laboratory Number:	6129-S-EDB.	Date Sampled:	09-17-93
Sample Matrix:	Water	Date Received:	09-17-93
Analysis Requested:	8010	Date Analyzed:	09-21-93
Condition:	NA		

Parameter	Sample Result (ug/L)	Spike Added (ug/L)	Spiked Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	SW-846 % Rec. Accept. Range
1,1-Dichloroethane	ND	10.0	10.0	0.1	100	39-150
1,2-Dichloroethane	ND	10.0	10.5	0.1	105	46-148
1,2-Dibromoethane	ND	10.0	10.4	0.1	104	32-160

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

CHAIN OF CUSTODY RECORD

Client/Project Name: SMITH INTERNATIONAL 91410

Project Location: 2198 E. BLOOMFIELD HWY.

Sampler: (Signature) R. E. O'Neill

Chain of Custody Tape No.

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	BTEX	EDB/EDC	MTBE	NAPTHALENE			Remarks
MW #4	9-21-93	1110	6145	WATER	2	✓						
MW #5	9-21-93	1155	6146	WATER	2	✓						
MW #2	9-21-93	1350	6147	WATER	3	✓	✓	✓	✓			
MW #6	9-21-93	1255	6148	WATER	3	✓	✓	✓	✓			

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
R. E. O'Neill	9-21-93	1432	[signature]	9-21-93	1445
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		

ENVIROTECH INC.
5796 U.S. Highway 64-3014
Farmington, New Mexico 87401
(505) 632-0615

ENVIROTECH INC.

GW-101

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OIL CONSERVATION DIV.
SANTA FE

PHASE 5

MARCH 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
FARMINGTON, SAN JUAN COUNTY
NEW MEXICO

PREPARED FOR
THE NEW MEXICO ENVIRONMENTAL DEPARTMENT

COMMISSIONED BY
MR. MAURICE STICKER
ENVIRONMENTAL AFFAIRS COORDINATOR
SMITH INTERNATIONAL INC.

MARCH 1993

PROJECT NO: 91410

5796 U.S. HIGHWAY 64 - 3014 • FARMINGTON, NEW MEXICO 87401 • PHONE: (505) 632-0615

PHASE 5
MARCH 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W
FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

PREPARED FOR
THE NEW MEXICO ENVIRONMENTAL DEPARTMENT

COMMISSIONED BY
MR. MAURICE STICKER
ENVIRONMENTAL AFFAIRS COORDINATOR
SMITH INTERNATIONAL INC.

PROJECT NO: 91410

MARCH 1993

ENVIROTECH INC.
ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO

(505) 632-0615

PHASE 5
MARCH 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W
FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

TABLE OF CONTENTS

SECTION 1

SECTION 2

APPENDIX

APRIL 12, 1993 **PROJECT NO: 91410**

PHASE 5
MARCH 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

INTRODUCTION

Envirotech Inc. has been retained by Smith International, Inc., to obtain closure at three spill remediation sites located on the subject property. This property is currently the staging yard for Smith Energy Services. This sampling report is prepared for the New Mexico Environmental Department (NMED), initiating a two year monitoring program of select monitoring wells. The monitoring program, described in a Phase 5 Workplan, was verbally approved by the NMED on March 26, 1993. This sampling parallels a New Mexico Oil Conservation Division (NMOCD) sampling plan requested in a letter dated November 17, 1992. The long term monitoring would verify cleanup of the site described in the following previously prepared closure reports:

- UST Closure Report, Diesel & Gasoline Fuel System (March 1992)
- Groundwater Assessment Supplemental Closure Report (October 1992)

All of the closure reports have been submitted to the NMED.

From December 1991 to June 1992, Envirotech Inc. conducted an extensive abatement program for site closures. Three sites of principal concern were involved at the subject property. These sites consisted of the:

Fuel Underground Storage Tank System (USTS)
Wash Bay Solids Disposal Area
Acid Tank Storage and Loading Area

Lead State of New Mexico regulatory agencies were contacted and involved with the closure operations. At all three sites, the reclamation action consisted of excavation and removal of the hydrocarbon contaminated soils for treatment. The excavations were extended to depths on the order of 28 feet (approximate depth of groundwater) with a track excavator. Approximately 13,000 cubic yards of soil were removed for treatment.

Based on the site assessment conducted during the closures and abatement operations, the hydrocarbon contamination of soil appeared to be limited to the immediate area around each site. All soils exceeding the current regulatory levels for hydrocarbon contamination were excavated and removed for remediation in all

areas practically feasible. Prior to backfilling, approval to close was given by Mr. Denny Foust, Oil and Gas Inspector, NMOCD, and/or the NMED for all areas of concern.

As part of the pre-abatement assessment, three groundwater monitor wells were installed on the property. Water samples analyzed from these wells indicated that the groundwater quality had not been significantly impacted. Considering the extent of the soil contamination, the NMOCD and NMED requested the installation of three additional groundwater monitoring wells and sampling to verify the groundwater quality. The analyses from the additional wells also indicated the residual hydrocarbon contamination to be well below the current regulatory limits. Monitor well locations are designated on the site plan located in the Appendix.

PURPOSE & SCOPE OF SERVICES

The purpose of this monitoring plan is to complete the closure of the UST site at the Smith International property. This sampling program is designed to complete a 2-year evaluation of the reclamation operations as described in a Phase 5 Workplan submitted to the NMED on March 18, 1993.

The scope of services that Envirotech provides includes the following:

A. Collect water samples from two down-gradient monitoring wells, MW-2 and MW-6, as shown on the attached site diagram. Sampling is scheduled to be done in March and September of 1993 and again in September of 1994. Sampling requirements beyond the initial sampling event will be reviewed by the NMED.

B. Samples are to be analyzed by Envirotech Labs for Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), MTBE, EDB, EDC, and Naphthalene.

C. Report on sampling results.

SAMPLING & ANALYSIS RESULTS

Monitor wells #2 and #6 were purged by bailing until a minimum of three (3) well volumes had been removed. After purging, water samples were collected in laboratory supplied 40 ml VOA vials and preserved with 5% $HgCl_2$. An additional one liter (1 L) sample was collected in a laboratory supplied glass container for the Naphthalene test. The water samples were placed on ice and transported to Envirotech's laboratory for BTEX and MTBE analysis using United States Environmental Protection Agency (USEPA) Method 8020. EDB and EDC analyses were done using USEPA Method 8010, and Naphthalene analyses were done using USEPA Method 8100. Sampling was performed according to USEPA SW-846 protocol.

A summary of the results of the laboratory analyses for the samples taken March 30, 1993 are presented in Table 1. Previous test results for samples taken May 26 and August 13, 1992 are also included for comparison. Table 2 contains field test results.

Table 1
Groundwater Monitoring
Laboratory Results (µg/l)
Smith International Inc.
2198 East Bloomfield Highway
Farmington, New Mexico

WELL #/DATE	BENZENE	TOLUENE	ETHYLBENZENE	T-XYLENE
MW-2 (3-30-93)	N/D	N/D	N/D	N/D
MW-6 (3-30-93)	N/D	N/D	N/D	N/D
MW-2 (5-26-92)	N/D	N/D	N/D	N/D
MW-6 (8-13-92)	N/D	7.9	N/D	2.7
WELL #/DATE	MTBE	EDB	EDC	NAPHTHA.
MW-2 (3-30-93)	N/D	N/D	N/D	N/D
MW-6 (3-30-93)	N/D	N/D	N/D	N/D

Notes:
1) N/D = not detected
2) T-XYLENE = Total xylene including p,m and o-xylene.
3) µg/l = Micrograms/liter equiv. to parts per billion.
4) MTBE = Methyl tertiary butyl ether
5) EDB = Ethylene dibromide
6) EDC = 1,2-dichloroethane
7) Naptha. = Naphthalene
8) Test Results by EPA Methods 8020, 8010, and 8100.

Table 2
Groundwater Monitoring
Field Test Results (3-30-93)
Smith International Inc.
2198 East Bloomfield Highway
Farmington, New Mexico

WELL #	OVM	pH	µMHO	TEMP (°C.)
MW-2	N/D	7.0	190	16
MW-6	N/D	7.0	190	17

Notes:
1) OVM = Organic Vapor Meter (PPM)
2) µMHO = Conductivity measurement
3) N/D = Not detected

All laboratory sample results including QA/QC documentation are included in the Appendix.

CONCLUSIONS

Sample results would indicate that residual contaminants detected in previous sampling events have naturally dissipated and/or degraded. Site remediation appears to have eliminated a source for groundwater contamination.

CLOSURE AND LIMITATIONS

The scope of Envirotech's services was limited to sampling of the designated monitor wells for BTEX, MTBE, EDC, EDB, and Naphthalene analysis. All work has been performed in accordance with generally accepted professional practices in geotechnical/environmental engineering and hydrogeology.

This report has been prepared for the exclusive use of the New Mexico Environmental Department and Mr. Maurice Sticker of Smith International as it pertains to the subject site located at Farmington, New Mexico.

I hereby certify that the work described in this report was performed under my direct supervision, and that I am personally familiar with the nature of the work, the results of the monitoring, and the contents of this report.

Respectfully submitted,
ENVIROTECH INC.

Robert E. O'Neill

Robert E. O'Neill
Environmental Engineer

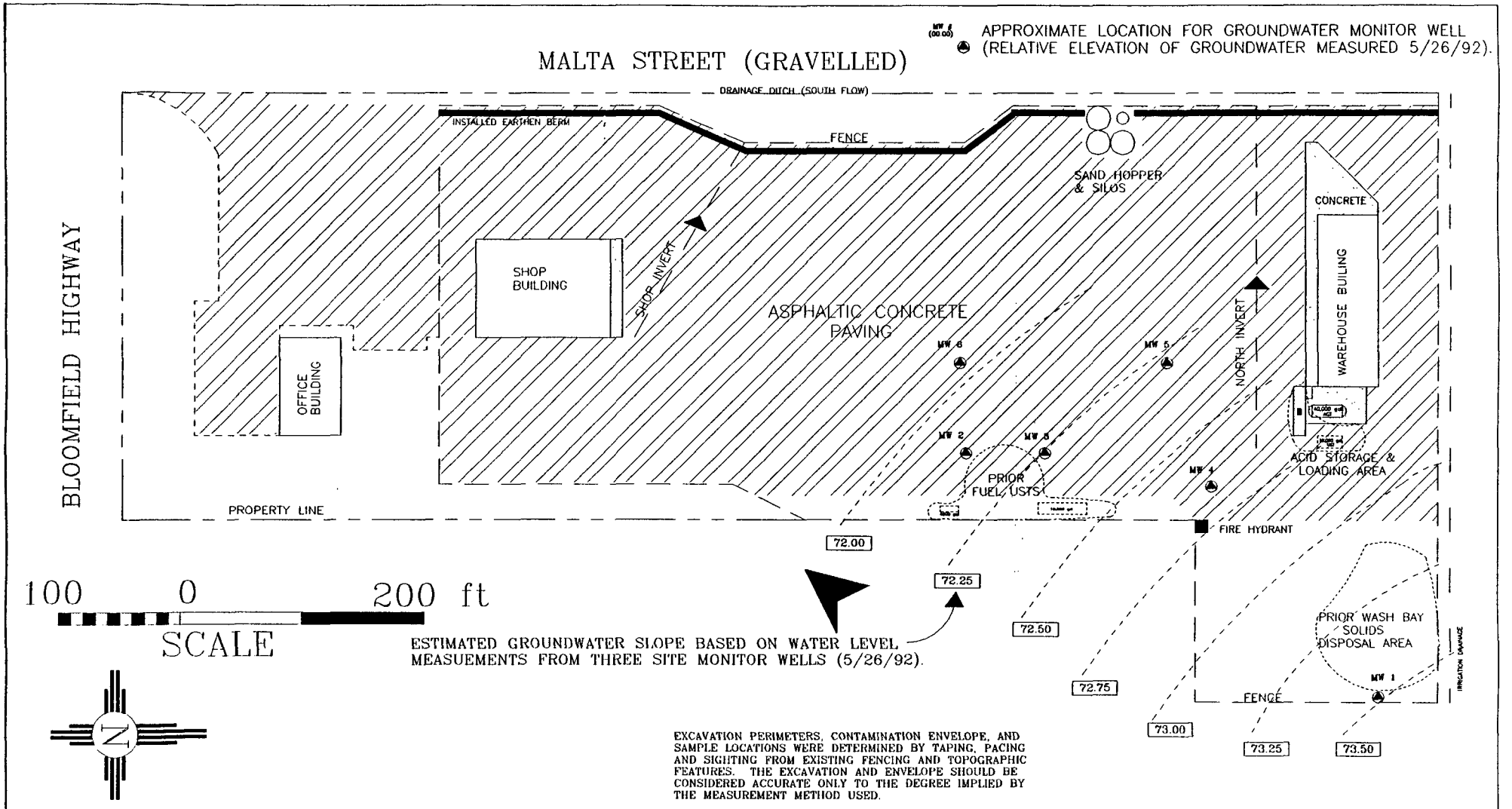
Reviewed by:

Michael K. Lane, P.E.
Geological Engineer

Appendix: Site Plan
Laboratory Results
QA/QC Documentation
Chain-of-Custody

REO/reo

91410MED.RPT



SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HWY
FARMINGTON, NEW MEXICO

PHASE 5 SAMPLING PROJECT NO: 91410

ENVIROTECH INC.
ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615

SITE PLAN & GROUNDWATER MONITOR WELL LOCATIONS

SHEET: 1	DRAWN: MKL
REVISED: REO	REV. DATE: 4/93

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Smith International	Project #:	91410
Sample ID:	MW # 2	Date Reported:	04-01-93
Laboratory Number:	4880	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	HgCl & Cool	Date Analyzed:	03-31-93
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Methyl-t-Butyl Ether	ND	0.2
Benzene	ND	0.3
Toluene	ND	1.5
Ethylbenzene	ND	0.3
p,m-Xylene	ND	0.5
o-Xylene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	95 %
Bromofluorobenzene	111 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

Analyst

Review

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8010
HALOGENATED VOLATILE ORGANICS

Client:	Smith International	Project #:	91410
Sample ID:	MW # 2	Date Reported:	04-01-93
Laboratory Number:	4880	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	Cool	Date Analyzed:	04-01-93
Condition:	Cool & Intact	Analysis Requested:	EDC-EDB

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
1,1-Dichloroethane	ND	0.7
1,2-Dichloroethane	ND	0.3
1,2-Dibromoethane	ND	2.0

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Bromofluorobenzene	102 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

Method 8010, Halogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

Analyst

Review

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	Smith International, Inc.	Project #:	91410
Sample ID:	MW # 2	Date Reported:	04-01-93
Laboratory Number:	4880	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	Cool	Date Analyzed:	04-01-93
Condition:	Cool & Intact	Analysis Requested:	8100

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Naphthalene	ND	0.2
Acenaphthylene	ND	0.2
Acenaphthene	ND	0.2
Fluorene	ND	0.2
Phenanthrene	ND	0.2
Anthracene	ND	0.2
Fluoranthene	ND	0.2
Pyrene	ND	0.2
Benzo(a)anthracene	ND	0.2
Chrysene	ND	0.2
Benzo(b) & Benzo(k) fluoranthene	ND	0.2
Benzo(a)pyrene	ND	0.2
Indeno(1,2,3-cd) pyrene & Dibenzo(a,h)anthracene	ND	0.2
Benzo(g,h,i)perylene	ND	0.2

SURROGATE RECOVERY	Parameter	Percent Recovery
	1-fluoronapthalene	93.9 %

Methods: Method 8100, Polynuclear Aromatic Hydrocarbons, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

Analyst

Review

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Smith International	Project #:	91410
Sample ID:	MW # 6	Date Reported:	04-01-93
Laboratory Number:	4881	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	HgCl & Cool	Date Analyzed:	03-31-93
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Methyl-t-Butyl Ether	ND	0.2
Benzene	ND	0.3
Toluene	ND	1.5
Ethylbenzene	ND	0.3
p,m-Xylene	ND	0.5
o-Xylene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	104 %
Bromofluorobenzene	106 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

Analyst

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ENVIROTECH LABS

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PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8010
HALOGENATED VOLATILE ORGANICS

Client:	Smith International	Project #:	91410
Sample ID:	MW # 6	Date Reported:	04-01-93
Laboratory Number:	4881	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	Cool	Date Analyzed:	04-01-93
Condition:	Cool & Intact	Analysis Requested:	EDC-EDB

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
1,1-Dichloroethane	ND	0.7
1,2-Dichloroethane	ND	0.3
1,2-Dibromoethane	ND	2.0

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Bromofluorobenzene	96 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

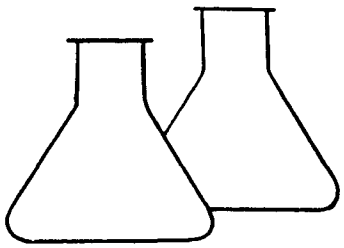
Method 8010, Halogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

Analyst

Review



ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	Smith International, Inc.	Project #:	91410
Sample ID:	MW # 6	Date Reported:	04-01-93
Laboratory Number:	4881	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	Cool	Date Analyzed:	04-01-93
Condition:	Cool & Intact	Analysis Requested:	8100

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Naphthalene	ND	0.2
Acenaphthylene	ND	0.2
Acenaphthene	ND	0.2
Fluorene	ND	0.2
Phenanthrene	ND	0.2
Anthracene	ND	0.2
Fluoranthene	ND	0.2
Pyrene	ND	0.2
Benzo(a)anthracene	ND	0.2
Chrysene	ND	0.2
Benzo(b) & Benzo(k) fluoranthene	ND	0.2
Benzo(a)pyrene	ND	0.2
Indeno(1,2,3-cd) pyrene & Dibenzo(a,h)anthracene	ND	0.2
Benzo(g,h,i)perylene	ND	0.2

SURROGATE RECOVERY	Parameter	Percent Recovery
	1-fluoronapthalene	93.7 %

Methods: Method 8100, Polynuclear Aromatic Hydrocarbons, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

Analyst

Review

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	04-01-93
Laboratory Number:	0331BPM.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	04-01-93
Condition:	NA	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Methyl-t-Butyl Ether	ND	0.2
Benzene	ND	0.3
Toluene	ND	1.5
Ethylbenzene	ND	0.3
p,m-Xylene	ND	0.5
o-Xylene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	103 %
Bromofluorobenzene	109 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	04-01-93
Laboratory Number:	0331BPM.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	04-01-93
Condition:	NA	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.3
Toluene	ND	1.5
Ethylbenzene	ND	0.3
p,m-Xylene	ND	0.5
o-Xylene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	103 %
Bromofluorobenzene	109 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8010
HALOGENATED VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	04-01-93
Laboratory Number:	0401DCE.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	04-01-93
Condition:	NA	Analysis Requested:	8010

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
1,1-Dichloroethane	ND	0.7
1,2-Dichloroethane	ND	0.3
1,2-Dibromoethane	ND	2.0

SURROGATE RECOVERIES:	Parameter	Percent Recovery
	Bromofluorobenzene	102 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

Method 8010, Halogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	04-01-93
Laboratory Number:	0401PAH.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	04-01-93
Condition:	NA	Analysis Requested:	8100

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Naphthalene	ND	0.2
Acenaphthylene	ND	0.2
Acenaphthene	ND	0.2
Fluorene	ND	0.2
Phenanthrene	ND	0.2
Anthracene	ND	0.2
Fluoranthene	ND	0.2
Pyrene	ND	0.2
Benzo(a)anthracene	ND	0.2
Chrysene	ND	0.2
Benzo(b) & Benzo(k) fluoranthene	ND	0.2
Benzo(a)pyrene	ND	0.2
Indeno(1,2,3-cd) pyrene & Dibenzo(a,h)anthracene	ND	0.2
Benzo(g,h,i)perylene	ND	0.2

SURROGATE RECOVERY:

Parameter	Percent Recovery
1-fluoronapthalene	95.8 %

Methods: Method 8100, Polynuclear Aromatic Hydrocarbons, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	NA	Project #:	NA
Sample ID:	Method Blank	Date Reported:	04-01-93
Laboratory Number:	0331PAH.MB	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	Cool	Date Analyzed:	04-01-93
Condition:	Cool & Intact	Analysis Requested:	8100

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Naphthalene	ND	0.2
Acenaphthylene	ND	0.2
Acenaphthene	ND	0.2
Fluorene	ND	0.2
Phenanthrene	ND	0.2
Anthracene	ND	0.2
Fluoranthene	ND	0.2
Pyrene	ND	0.2
Benzo(a)anthracene	ND	0.2
Chrysene	ND	0.2
Benzo(b) & Benzo(k) fluoranthene	ND	0.2
Benzo(a)pyrene	ND	0.2
Indeno(1,2,3-cd) pyrene & Dibenzo(a,h)anthracene	ND	0.2
Benzo(g,h,i)perylene	ND	0.2

SURROGATE RECOVERY	Parameter	Percent Recovery
	1-fluoronapthalene	94.5 %

Methods: Method 8100, Polynuclear Aromatic Hydrocarbons, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

** QUALITY ASSURANCE EPA METHOD 8020
MATRIX SPIKE - AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Sample Spike	Date Reported:	04-01-93
Laboratory Number:	4879	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Analysis Requested:	BTEX	Date Analyzed:	03-31-93
Condition:	NA		

Parameter	Sample Result (ug/L)	Spike Added (ug/L)	Spiked Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	SW-846 % Rec. Accept. Range
Benzene	ND	20	17.3	0.3	86	39-150
Toluene	ND	20	17.7	1.5	87	46-148
Ethylbenzene	ND	20	18.5	0.3	92	32-160
p,m-Xylene	ND	20	18.4	0.5	91	46-148
o-Xylene	ND	20	18.4	0.3	91	46-148

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

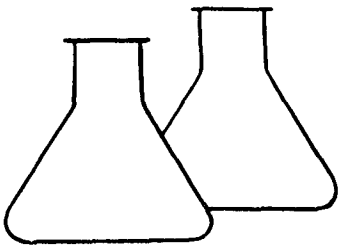
Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review



ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

** QUALITY ASSURANCE EPA METHOD 8010
MATRIX SPIKE - HALOGENATED VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Sample Spike	Date Reported:	04-01-93
Laboratory Number:	4881VOL.	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Analysis Requested:	8010	Date Analyzed:	04-01-93
Condition:	NA		

Parameter	Sample Result (ug/L)	Spike Added (ug/L)	Spiked Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	SW-846 % Rec. Accept. Range
1,1-Dichloroethane	ND	10.0	10.5	0.7	105	39-150
1,2-Dichloroethane	ND	10.0	9.0	0.3	89	46-148
1,2-Dibromoethane	ND	10.0	9.2	2.0	91	32-160

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

2502

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location
SMITH INT'L # 9141O	2198 EAST BLOOMFIELD HWY,

Sampler: (Signature)	Chain of Custody Tape No.
R. E. O'Neill	

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	BTEX 8020	MTBE	EDB	EDC	NAPTHALENE		Remarks
MW #4	3-30-93	1120	4878	WATER	2	✓						
MW #5	3-30-93	1200	4879	WATER	2	✓						
MW #2	3-30-93	1005	4880	WATER	3	✓	✓	✓	✓	✓		
MW #6	3-30-93	1040	4881	WATER	3	✓	✓	✓	✓	✓		

ANALYSIS/PARAMETERS

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
R. E. O'Neill	3-30-93	1255	Linda Pinder	3-30-93	1255
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		

ENVIROTECH INC.
5796 U.S. Highway 64-3014
Farmington, New Mexico 87401
(505) 632-0615

ENVIROTECH INC.

GW-101

RECEIVED
APR 15 1993
OIL CONSERVATION DIV.
SANTA FE

MARCH 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
FARMINGTON, SAN JUAN COUNTY
NEW MEXICO

PREPARED FOR
THE NEW MEXICO OIL CONSERVATION DIVISION

COMMISSIONED BY
MR. MAURICE STICKER
ENVIRONMENTAL AFFAIRS COORDINATOR
SMITH INTERNATIONAL INC.

MARCH 1993 **PROJECT NO: 91410**

5796 U.S. HIGHWAY 64 - 3014 • FARMINGTON, NEW MEXICO 87401 • PHONE: (505) 632-0615

MARCH 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W
FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

PREPARED FOR
THE NEW MEXICO OIL CONSERVATION DIVISION

COMMISSIONED BY
MR. MAURICE STICKER
ENVIRONMENTAL AFFAIRS COORDINATOR
SMITH INTERNATIONAL INC.

PROJECT NO: 91410

MARCH 1993

ENVIROTECH INC.
ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO

(505) 632-0615

MARCH 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W
FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

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APRIL 12, 1993 **PROJECT NO: 91410**

MARCH 1993 SAMPLING
SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HIGHWAY
FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

INTRODUCTION

Envirotech Inc. has been retained by Smith International, Inc., to obtain closure at three spill remediation sites located on the subject property. This property was the staging yard for Smith Energy Services. This sampling report is prepared for the New Mexico Oil Conservation Division (NMOCD), initiating a monitoring program of select monitoring wells. This sampling plan follows a request by Mr. William C. Olson of the NMOCD in a letter dated November 17, 1992 to Mr. Maurice Sticker of Smith International Inc (attached). The long term monitoring requested would verify cleanup of the sites described in the following previously prepared closure reports:

- Surface Impoundment Closure Report, Wash Bay Solids Disposal Area (April 1992)
- Acid UST and Sump Closure Report, Acid Storage Tank and Loading Area (May 1992)
- Acid UST & Sump Closure Supplemental Report, Smith International, Inc., 2198 East Bloomfield Highway, Farmington, New Mexico (July 1992)
- Groundwater Assessment Supplemental Closure Report (October 1992)

All of the closure reports have been submitted to the NMOCD.

From December 1991 to June 1992, Envirotech Inc. conducted an extensive abatement program for site closures. Three sites of principal concern were involved at the subject property. These sites consisted of the:

Fuel Underground Storage Tank System (USTS)
Wash Bay Solids Disposal Area
Acid Tank Storage and Loading Area

Lead State of New Mexico regulatory agencies were contacted and involved with the closure operations. At all three sites, the reclamation action consisted of excavation and removal of the hydrocarbon contaminated soils for treatment. The excavations were extended to depths on the order of 28 feet (approximate depth of groundwater) with a track excavator. Approximately 13,000 cubic yards of soil were removed for treatment.

Based on the site assessment conducted during the closures and abatement operations, the hydrocarbon contamination of soil appeared to be limited to the immediate area around each site. All soils exceeding the current regulatory levels for hydrocarbon contamination were excavated and removed for remediation in all areas practically feasible. Prior to backfilling, approval to close was given by Mr. Denny Foust, Oil and Gas Inspector, NMOCD, and/or the NMED for all areas of concern.

As part of the pre-abatement assessment, three groundwater monitor wells were installed on the property. Water samples analyzed from these wells indicated that the groundwater quality had not been significantly impacted. Considering the extent of the soil contamination, the NMOCD and NMED requested the installation of three additional groundwater monitoring wells and sampling to verify the groundwater quality. The analyses from the additional wells also indicated the residual hydrocarbon contamination to be well below the current regulatory limits. Well locations are designated on the site plan located in the Appendix.

PURPOSE & SCOPE OF SERVICES

The purpose of this monitoring plan is to complete the closure of those areas under the NMOCD's jurisdiction, the waste acid underground storage tank and the wash bay solids disposal area sites at the Smith International property. This sampling program is designed to complete a long term monitoring evaluation of the reclamation operations.

The scope of services that Envirotech provides includes the following:

A. Monitor wells MW-4 and MW-5 will be sampled in March and September of 1993. Thereafter, these monitor wells will be annually sampled during the month of September. Future sampling requirements will be reviewed by the NMOCD.

B. Groundwater samples from the monitor wells are to be analyzed for pH, Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX). Samples are to be analyzed by Envirotech Labs using EPA method 8020 for BTEX.

C. The results of the monitor well sampling will be submitted to the OCD within 60 days of the sampling event.

SAMPLING & ANALYSIS RESULTS

Monitor wells #4 and #5 were purged by bailing until a minimum of three (3) well volumes had been removed. After purging, water samples were collected in laboratory supplied 40 ml VOA vials and

preserved with 5% $HgCl_2$. The water samples were placed on ice and transported to Envirotech's laboratory for BTEX analysis using United States Environmental Protection Agency (USEPA) Method 8020. Sampling was done according to USEPA SW-846 protocol.

A summary of the results of the laboratory analyses for the samples taken March 30, 1993 are presented in Table 1. Previous laboratory results for samples taken August 13, 1992 are also included for comparison. Table 2 contains field test results.

Table 1
Groundwater Monitoring
Laboratory Results (µg/l)
Smith International Inc.
2198 East Bloomfield Highway
Farmington, New Mexico

WELL #/DATE	BENZENE	TOLUENE	ETHYLBENZENE	T-XYLENE
MW-4 (3-30-93)	N/D	N/D	N/D	N/D
MW-5 (3-30-93)	N/D	N/D	N/D	N/D
MW-4 (8-13-92)	N/D	5.4	4.1	N/D
MW-5 (8-13-92)	N/D	5.1	3.7	3.2

Notes:
1) N/D = Not detected.
2) T-XYLENE = Total xylene including p,m-xylene and o-xylene.
3) µg/L. = Micrograms per liter equivalent to parts per billion.
4) Test results by EPA Method 8020.

Table 2
Groundwater Monitoring
Field Test Results (3-30-93)
Smith International Inc.
2198 East Bloomfield Highway
Farmington, New Mexico

WELL #	OVM	pH	µMHO	TEMP (°C.)
MW-4	N/D	6.9	190	16
MW-5	N/D	7.3	250	16

Notes:
1) OVM = Organic Vapor Meter
2) µMHO = Conductivity measurement
3) N/D = Not detected

All laboratory sample results including QA/QC documentation are included in the Appendix.

CONCLUSIONS

Sample results would indicate that residual contaminants detected in previous sampling events have naturally dissipated and/or degraded. Site remediation appears to have eliminated a source for groundwater contamination.

CLOSURE AND LIMITATIONS

The scope of Envirotech's services was limited to sampling of the designated monitor wells for BTEX analysis and field testing. All work has been performed in accordance with generally accepted professional practices in geotechnical/environmental engineering and hydrogeology.

This report has been prepared for the exclusive use of the New Mexico Oil Conservation Division and Mr. Maurice Sticker of Smith International as it pertains to the subject site located at Farmington, New Mexico.

I hereby certify that the work described in this report was performed under my direct supervision, and that I am personally familiar with the nature of the work, the results of the monitoring, and the contents of this report.

Respectfully submitted,
ENVIROTECH INC.

Robert E. O'Neill

Robert E. O'Neill
Environmental Engineer

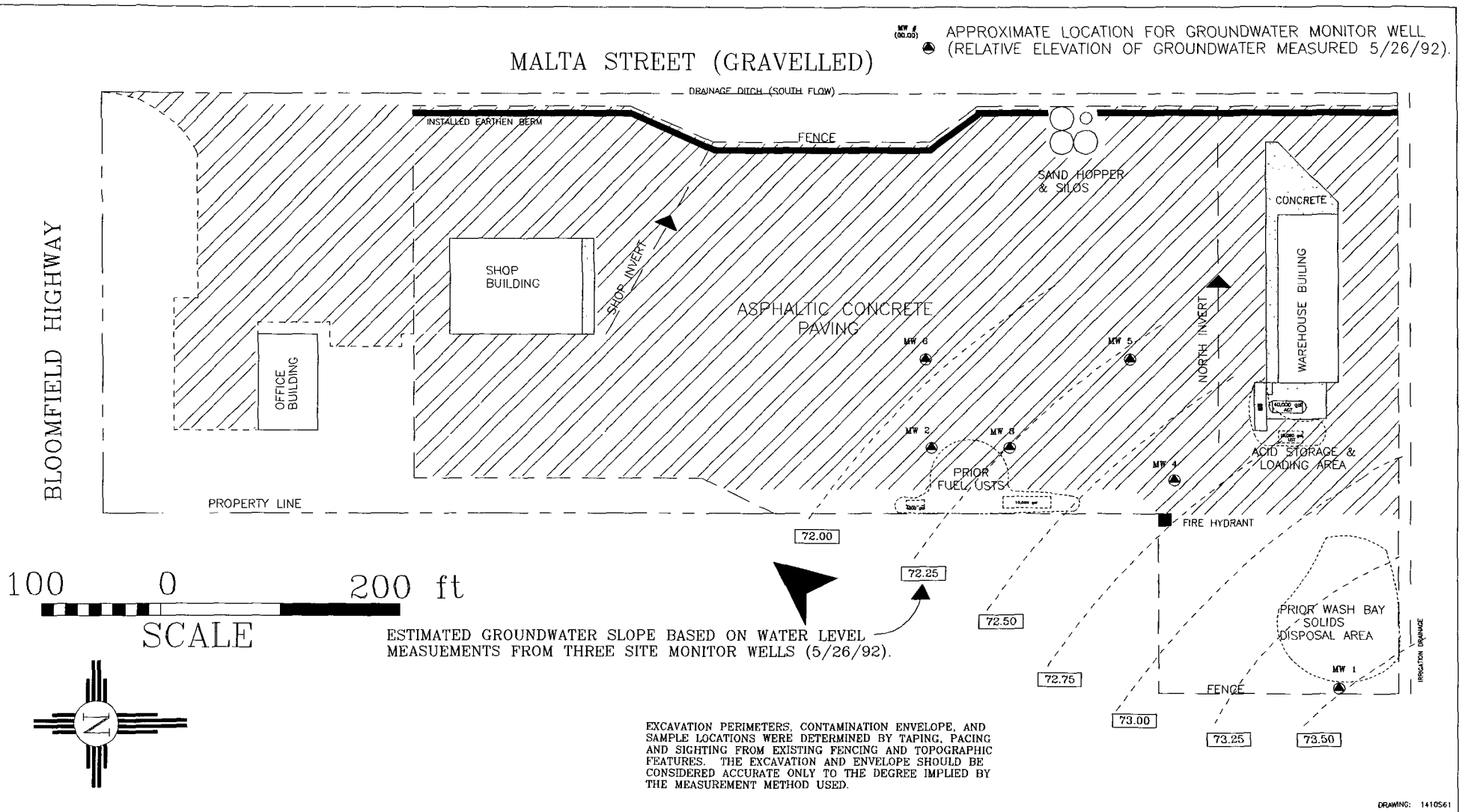
Reviewed by:

Michael K. Lane, P.E.
Geological Engineer

Appendix: Site Plan
Laboratory Results
QA/QC Documentation
Chain-of-Custody

REO/reo

91410MOC.RPT



SMITH INTERNATIONAL INC.
2198 EAST BLOOMFIELD HWY
FARMINGTON, NEW MEXICO

SAMPLING PROGRAM

PROJECT NO: 91410

ENVIROTECH INC.

ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615

SITE PLAN & GROUNDWATER MONITOR WELL LOCATIONS

SHEET: 1	DRAWN: MKL
REVISED: REO	REV. DATE: 4/93

91410

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

DRUG FREE

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

November 17, 1992

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT NO. P-667-242-310

Mr. Maurice Sticker
Environmental Affairs Coordinator
Smith International, Inc.
16740 Hardy St.
Houston, Texas 72205-0068

RE: SITE REMEDIATION AND GROUND WATER ASSESSMENT
SMITH INTERNATIONAL, INC.
FARMINGTON, NEW MEXICO

Dear Mr. Sticker:

The New Mexico Oil Conservation Division (OCD) has completed a comprehensive review of the following documents submitted by Envirotech, Inc. on behalf of Smith International, Inc. regarding soil remediation activities and ground water quality investigations at the Smith International, Inc. Farmington, New Mexico service company facility:

1. April 1992 "SURFACE IMPOUNDMENT CLOSURE REPORT, WASH BAY SOLIDS DISPOSAL AREA".

2. May 1992 "ACID UST AND SUMP CLOSURE REPORT".

3. June 1992 "OFFSITE DRAINAGE CLOSURE REPORT".

4. July 1992 "ACID UST & SUMP CLOSURE SUPPLEMENTAL REPORT, SMITH INTERNATIONAL, INC., 2198 EAST BLOOMFIELD HIGHWAY, FARMINGTON, NEW MEXICO".

5. October 1992 "GROUNDWATER ASSESSMENT SUPPLEMENTAL, CLOSURE REPORT, SMITH INTERNATIONAL, INC., FARMINGTON, NEW MEXICO".

The remedial activities for contaminated soils related to Smith International's waste disposal activities, as contained in the above reports, meet the OCD's requirements in effect at the time of closure of these disposal units. However, since the October 1992 report documented the presence of low level ground water contaminants in the monitor wells downgradient of both the waste acid underground storage tank and the wash bay solids disposal area the OCD requires the following long term monitoring:

1. Monitor wells MW-4 and MW-5 will be sampled in March and September of 1993. Thereafter, these monitor wells will be annually sampled during the month of September. Upon renewal of the facility's ground water discharge plan the sampling requirements will be reviewed.

2. Ground water samples from the monitor wells will be analyzed for pH, Benzene, Toluene, Ethylbenzene and Xylenes using EPA approved laboratory methods.

3. The results of the monitor well sampling will be submitted to OCD within 60 days of the sampling event.

Please be advised that OCD approval does not relieve you of liability should future sampling show ground water to be contaminated in excess of New Mexico Water Quality Control Commission ground water standards as a result of these closed disposal areas.

If you have any questions, please contact me at (505) 827-5885.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: Denny Foust, OCD Aztec Office
Michael K. Lane, Envirotech, Inc.

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Smith International	Project #:	91410
Sample ID:	MW # 4	Date Reported:	04-01-93
Laboratory Number:	4878	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	HgCl & Cool	Date Analyzed:	03-31-93
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.3
Toluene	ND	1.5
Ethylbenzene	ND	0.3
p,m-Xylene	ND	0.5
o-Xylene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	92 %
Bromofluorobenzene	98 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

Analyst

Review

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
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EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Smith International	Project #:	91410
Sample ID:	MW # 5	Date Reported:	04-01-93
Laboratory Number:	4879	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	HgCl & Cool	Date Analyzed:	03-31-93
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.3
Toluene	ND	1.5
Ethylbenzene	ND	0.3
p,m-Xylene	ND	0.5
o-Xylene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	98 %
Bromofluorobenzene	94 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

Analyst

Review

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PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	04-01-93
Laboratory Number:	0331BPM.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	04-01-93
Condition:	NA	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.3
Toluene	ND	1.5
Ethylbenzene	ND	0.3
p,m-Xylene	ND	0.5
o-Xylene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	103 %
Bromofluorobenzene	109 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

** QUALITY ASSURANCE EPA METHOD 8020
MATRIX SPIKE - AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Sample Spike	Date Reported:	04-01-93
Laboratory Number:	4879	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Analysis Requested:	BTEX	Date Analyzed:	03-31-93
Condition:	NA		

Parameter	Sample Result (ug/L)	Spike Added (ug/L)	Spiked Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	SW-846 % Rec. Accept. Range
Benzene	ND	20	17.3	0.3	86	39-150
Toluene	ND	20	17.7	1.5	87	46-148
Ethylbenzene	ND	20	18.5	0.3	92	32-160
p,m-Xylene	ND	20	18.4	0.5	91	46-148
o-Xylene	ND	20	18.4	0.3	91	46-148

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

2502

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location
SMITH INT'L # 91410	2198 EAST BLOOMFIELD HWY.

Sampler: (Signature)	Chain of Custody Tape No.
R. E. O'Neill	

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	BTEX 8020	MTBE	EDB	EDC	NAPTHALENE		Remarks
MW #4	3-30-93	1120	4878	WATER	2	✓						
MW #5	3-30-93	1200	4879	WATER	2	✓						
MW #2	3-30-93	1005	4880	WATER	3	✓	✓	✓	✓	✓		
MW #6	3-30-93	1040	4881	WATER	3	✓	✓	✓	✓	✓		

ANALYSIS/PARAMETERS

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
R. E. O'Neill	3-30-93	1255	Linda Pinder	3-30-93	1255
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		

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